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AMERICAN GAS LIGHT JOURNAL

FIFTY-EIGHTH YEAR

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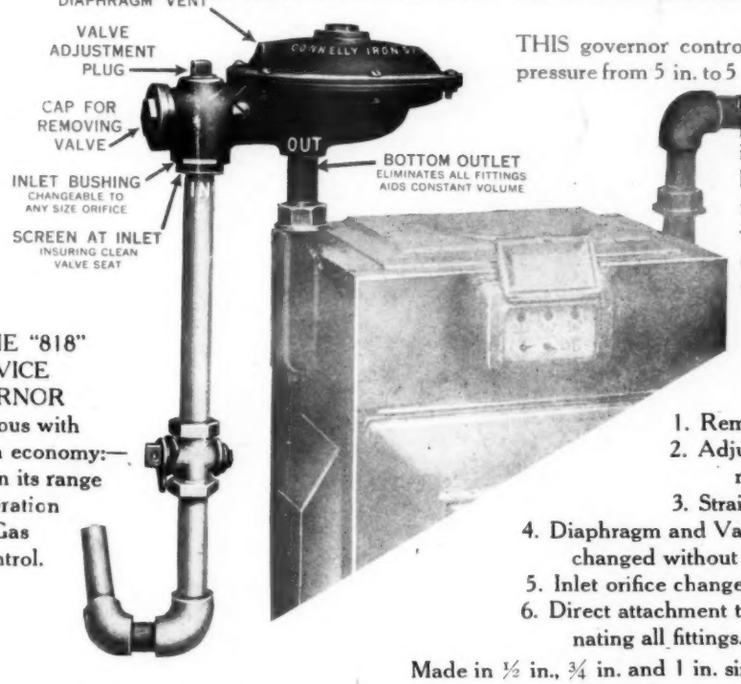
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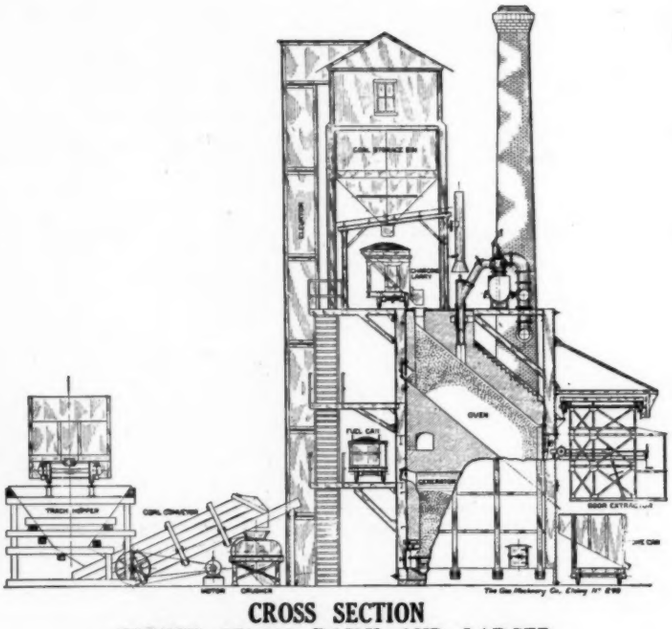

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1859 FIFTY-EIGHTH YEAR 1916

AMERICAN

GAS LIGHT JOURNAL

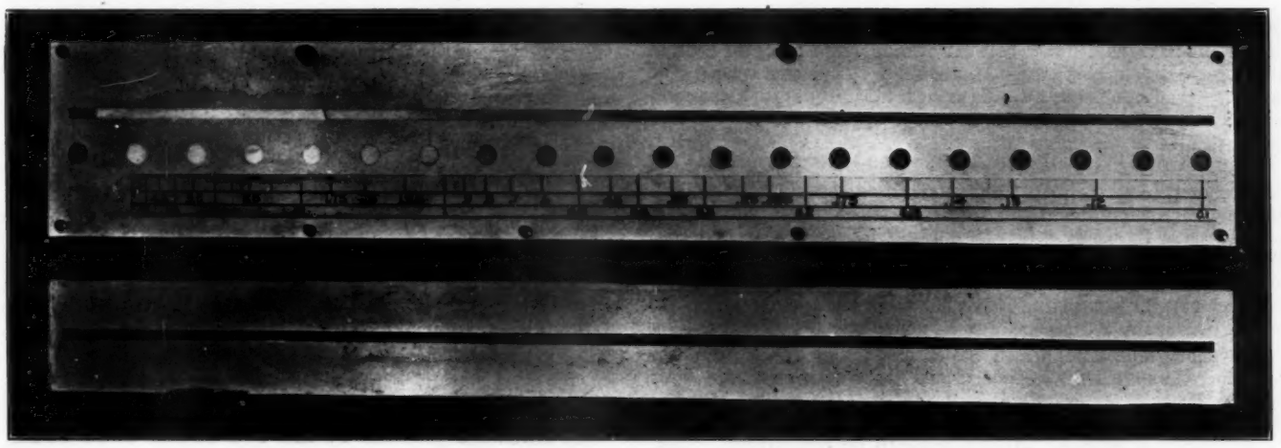
VOL. CV., No. 7. NEW YORK, AUGUST 14, 1916 WHOLE No. 3,049.

New Illumination Indicator Requires No Manipulation or Adjustment to Indicate Candle Power

Is Self-Contained and Without External Connections or Accessories, and is Characterized by Absence of Electrical Adjustments or Measurements—Has Range of from One-Tenth Foot-Candles to Fifty Foot-Candles

By ROBERT FFRENCH PIERCE

To the user of light, means for measuring the results obtained are certainly of far more importance than are the kitchen scales to the housewife. He is interested not only in obtaining the most light for his money, but in obtaining the best results by avoiding wasteful and improper use of light. It is safe to say that at least 90 per cent of light users could, as the result of a careful investigation, make improvements involving either considerable savings or improvements, or both.



Light is the only commodity used by the meanufacturer, the use of which depends in most cases upon guess-work. To the gas or electric company, the determination of the illuminating service rendered is only secondary to the measurement of the gas or electricity sold.

The amount of business lost by reason of appliances or conditions unfavorable to the securing of good and economical illumination is enormous. If the salesman, anxious to meet strenuous competition, advises the installation of equipment which later proves inadequate, the loss of the business is likely to result. If, in the laudable intention of erring on the safe side, he installs an excessive capacity, he is likely to lose the business to a competitor who suggests an installation more efficient, though perhaps utilizing a much more expensive illuminant. These are simply a few of hundreds of examples of the necessity for a convenient means of measuring illumination, both from the point of view of the seller and from that of the buyer of light.

Illumination-Measuring Instruments Hitherto in Use Too Expensive

The illumination-measuring instruments heretofore available have failed to enjoy wide practical application because of their high cost ($150 to $250), the comparatively complicated adjustments required, and the necessity (or at least desirability) of two men to operate them—one to read the ammeter and maintain the current constant, the other to maniplate the photometer.

In order to render the operator free of the laboratory, recourse is had to the scarcely more favorable expedient of compelling him to carry the laboratory with him.

Portable electric measuring instruments are at best unlikely to give, in practice, the high precision which is the only reason for employing them.

All of the better known photometers require manipulation—that is, the instrument parts must be adjusted to obtain a "balance" from which the illumination may be read.

The instrument herein described is the outcome of a request from an automobile manufacturer for a cheap, simple, yet sufficiently accurate illumination indicator, to be used by superintendents and foremen in obtaining and maintaining lighting installations in a condition favorable to efficient work. The following requirements were imposed:

Absence of electrical adjustments or measurements.

The illumination to be indicated without manipulation or adjustment.

The instrument to be entirely self-contained, without external connections or accessories.

A range of from 0.1 foot-candle to 50 foot-candles.

Cost not to exceed $50.00.

It was desired to equip the factory with eleven of these instruments, and it was expected that they would probably be subjected

to rough handling and frequent damage, so an inexpensive instrument was particularly desirable. These requirements have been satisfactorily met.

In developing the instrument, the writer used a small box containing a standard lamp at one end.

The cover of the box was of opal glass, over which a thin sheet of opaque white material having a lengthwise slot, was placed.

The light to be measured was allowed to fall upon the cover, and it illuminated the opaque material through the slot in which the opal glass was seen. The latter was most highly illuminated at the end nearest the standard lamp in the box, the illumination decreasing toward the opposite end.

A scale was placed parallel to the slot from which the illumination was read at a point opposite the place where the slot and the adjoining opaque surface appeared equally bright. In practice, however, it was found difficult to locate exactly the point of equal brightness, and the slot was replaced by a series of small holes.

Method of Reading

The illumination is read opposite the hole appearing of equal brightness with the surrounding field, the holes to the right all being brighter, and those to the left darker.

In a room in which the illumination varied from 0.2 foot-candles to 4 foot-candles, it was possible to check very closely the readings of an expensive illumination-photometer by selecting locations in which the holes successively appeared equal in brightness to the surrounding field.

In other cases, that is, where none of the holes were exactly equal in brightness to the field, one hole being brighter and the next to the left darker, it was necessary to estimate the illumination between the values opposite the two holes.

To overcome this difficulty the holes were placed in a movable slide. By shifting this slide by a distance which need never exceed one-half the distance between two adjacent holes all degrees of illumination may be easily measured. This can scarcely be termed an adjustment in the sense of the ordinary photometer, since the direction of the shift is always apparent to the eye and the extent is small.

The use of a thin opaque sheet over opal glass was quite satisfactory, but not very sensitive, since the holes did not entirely disappear at the point of balance on account of the narrow shadow at the edge of the field due to the thickness of the opaque material. The substitution of a piece of suitable paper in which the holes were replaced by waxed spots proved of far greater sensibility, and, by carefully selecting materials and using precautions in waxing the spots, a thoroughly satisfactory result was obtained.

The photograph from which the accompanying illustration was reproduced was taken under artificial light of nearly the same color as that of the standard lamp, so that the optical effect is fairly well reproduced. The scale graduations do not follow a known law, and must be initially obtained by experiment. This, however, concerns no one but the manufacturer of the instrument.

An additional slide in which the field is "grayed" to such an extent as to absorb 9/10 of the light reflected by a white field is provided for the measurement of intensities up to 50 foot-candles in which case the scale readings are multiplied by ten.

Necessary that Field Be Viewed Always from Same Angle

In an instrument of this character, it is necessary that the field be viewed always at the same angle. For this purpose a small sighting arrangement (not shown in the illustration), is placed in the lower slot and slides opposite the hole being viewed, the sight being taken over the top. The "sighter" is kept in the box when not in use.

A tungsten electric lamp was used as a standard, extensive researches failing to disclose a flame standard of sufficient steadiness. Instead of attempting to maintain a constant current through the standard lamp, advantage is taken of the fact that the dry batteries used as a source of energy depreciate in voltage during the time of use in a way which does not differ appreciably among different batteries. A chart is provided which gives the corrected reading corresponding to any actual reading taken after a known period of elapsed time after the switching on of the lamp.

The use of this table is necessary only in case of readings extending over a period of an hour or more, and then only where considerable precision is desired. For ordinary commercial and industrial purposes the scale readings may be used without correction. The voltage decrease is most rapid during the first three hours, and, since it is always possible to arrange the taking of readings so as to permit the lamp being turned on three hours previously, two lamps are provided; the first (or discharge) lamp being an ordinary 0.6 watt lamp used for "shooting off the peak" of the voltage curve, the second being the standard lamp which is switched in circuit after the "discharge" lamp has been burning three hours, and just before commencing the taking of readings. A two-point switch on the end of the box is provided for this purpose.

Calibrating Instruments

Illumination measurements are usually made at infrequent intervals, and it is generally more economical to discard the batteries after each period of use. If desired, however, a standard lamp and ammeter may be set up in a convenient place where instruments may be calibrated before each period of use, in which case the dry batteries may be used over and over precisely as in any other portable photometer. In any case calibration should be done under laboratory conditions.

Calibration is accomplished by permitting the battery to discharge for three hours through the discharge lamp, then switching on the standard lamp and subjecting the field to a known illumination—say 1 foot-candle. The instrument reading is then taken and all corrected readings thereafter obtained multiplied by the calibration reading. For example, if the instrument reading is 0.95 when subjected to a 1 foot-candle illumination, all values as taken from the chart are multiplied by 0.95.

Usually the simpler (and in the long run, more economical plan) is to use fresh batteries and discard them after the first period of service, thus eliminating the necessity for calibration.

Batteries are easily renewed by opening the box, taking out and disconnecting the used batteries, and connecting new ones in the same way, and replacing. The connection wires are colored so that the blue wire is always attached to the zinc of one battery, the white to the carbon of the other battery, and the red between the remaining zinc and carbon terminals. This is the only attention required by the instrument.

The standard lamp is secured in proper position (when replacement is necessary) by sighting through a slot in the bottom of the box, bringing the filaments in line by turning the loosened socket, which is then tightened and secured by a nut on the outside of the box. A multiplying figure is given with each new standard lamp furnished which lamp is, of course, well seasoned.

Both Eyes Used in Taking Readings

One advantage possessed by this type of instrument makes it particularly suitable for the use of those who make photometric measurements infrequently—the fact that both eyes are used. Amateurs often find the use of one eye alone very fatiguing, and have difficulty in obtaining consistent results. The "two-eye" instrument usually gives the better results in the hands of inexpert users. Using this simple device, untrained observers have repeatedly duplicated the results obtained by experts with expensive instruments, with a degree of precision sufficient for all commercial and industrial work.

The instrument has proven thoroughly satisfactory after an extended period of use. Some of the "fields" have been soiled by careless handling, but were easily "freshened" by means of a soft eraser. Even if spoiled by oil or grease they may be renewed at negligible expense.

The applications of an instrument of this character are numberless. Investigation of complaints of insufficient light, comparisons of competitive installations, locating wastes due to improper distribution (excessive illumination in some places and inadequate illumination in others)—these are problems which arise in every factory and commercial establishment. Again, there is nothing so convincing to a user of light as an actual measurement under his own eyes, of the goods being delivered. Extravagant and unfounded claims for lighting novelties which ordinarily must go unchallenged, soon dissolve into thin air under the scrutiny of the illumination indicator.

Three Different Schemes Carried Out In Original Gas Burner Installation Under Boilers of Toledo Railways & Light Company

First Was to Burn Gas Over Existing Grates; Second to Burn Gas Only, with Grates Removed, and, Third, to Burn Gas or Coal, or Both, at the Same Time—Last Has Great Possibilities Though It Has Not Been Sufficiently Tried to Really Determine Its Value

The Toledo Railways & Light Company has recently equipped several boilers with burners burning coke oven by-product gas.

In the original installation three different schemes were carried out, namely:

To burn gas only, over the present grates.

To burn gas only, with the grates removed.

To burn gas or coal, or both at the same time.

BED OF REFRACTORY MATERIAL COVERED ENTIRE SURFACE OF GRATE

In the first scheme a bed of refractory material covers the entire surface of the grate with all openings on grates closed by asbestos sheet, except a 12-in. strip, the width of the grate, through which secondary air is allowed to enter the combustion chamber.

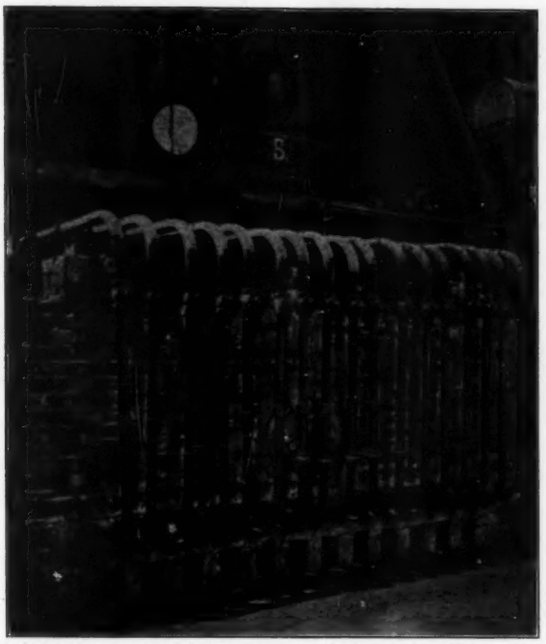
Results with this scheme proved satisfactory up to 150 per cent of the rated capacity of the boiler, after which point, due to the small cross-section area of the combustion chamber, the heat became too intense and the temperature of the arch too high to justify any increase in rating.

In the second scheme the grates were removed and a combustion chamber was created by bricking up the opening from the cinder path to the ash pit, and extending the wall to the bridge wall. Another wall was erected, 3 ft. in front of the vertical line of the boiler with suitable side walls and arch, as well as opening for burners, secondary air duct, etc. This gave a Dutch oven effect, and increased the combustion chamber by 3 ft. in length and about 34 in. in height.

The cinder path is covered with insulation and refractory as well as a series of ducts starting from the center of the combustion chamber to the front of the boiler conveying secondary air for combustion. This arrangement made it possible to burn sufficient gas to secure 250 per cent of the rated capacity of the boiler with fairly good economies, and no injurious effects on any part of the boiler.

The third scheme consists of a series of burners that convey the gas to a special tile forming the first block of the igniting arch.

The gas is burned over the incandescent surface of the coal and secures the air for combustion from the over-ventilation of the coal fire.



BRICKWORK GAVE DUTCH OVEN EFFECT IN SECOND SCHEME

This scheme has great possibilities, but it has not been sufficiently tried to really determine its value.

Value of Manufactured Products in Country Attained Total of $24,246,323,000 in 1914

The value of manufactured products in the United States was $24,246,323,000 in 1914, and $20,672,052,000 in 1909, the increase being $3,574,271,000, or 17.3 per cent, according to figures compiled by the U. S. Bureau of Census. The average per establishment was approximately $88,000 in 1914 and $77,000 in 1909.

The value of products represents their selling value or price at the plants as actually turned out by the factories during the census year and does not necessarily have any relation to the amount of sales for that year. The values under this head also include amounts received for work done on materials furnished by others.

The value added by manufacture represents the difference between the cost of materials used and the value of the products manufactured from them. The value added by manufacture was $9,878,234,000 in 1914, and $8,529,261,000 in 1909, the increase being $1,348,973,000, or 15.8 per cent. The value added by manufacture formed 40.7 per cent of the total value of products in 1914, and 41.3 per cent in 1909.

Attributes Prodigal Waste in Country's Industrial Plants to Lack of Technically-Trained Men

European Countries Have, Directly Connected with Their Industries, a Great Many More Technical Men Than Can Be Found In An Equal Number of Our Manufacturing Plants—It Was They Who Developed the Profitable System of Pulling a Dividend Out of the Scrap Heap.

Waste is the great vice of the American nation. From the very things we were spending money to get rid of, European nations have been making millions of dollars. William C. Redfield, Secretary of Commerce of the United States, in an authorized interview in *The Nation's Business*, attributes the waste in our industries to the lack of technically-trained men. One of the most glaring instances of our neglect of waste utilization, he stated, is found in the coal and coke industry.

Industry's Problems After the War

"To be or not to be" was not more puzzling to the melancholy Dane than is "how meet competition after the war" to a forward-looking American business man.

There are many answers. Making the mouse trap a little better and with a little less effort, is one answer and a good one, including as it does scientific operation, technically-trained workers, a full share of co-operation between head-worker and hand-worker, and legitimate combination for foreign trade.

But there is another answer and in it may be found a four or five per cent profit—that consummation devoutly to be wished by all business—the dividend. It is the utilization of by-products, the elimination of waste.

Tap any business man on the shoulder and he will tell you that European nations are ahead of the United States when it comes to utilizing the waste products of their industries. This is due to many causes. The underlying, the prime cause, is human nature. As the individual, so the nation.

Given a vast country with wonderful natural resources, a people does not feel the need of economy. Crowded Europe, however, depleting natural resources through the centuries, has been obliged to cut the corners in order to survive.

The Engineer's Relationship to Waste Utilization

The first short cut, and the one that business in America has only lately discerned, was the development of an elaborate system of technical education.

Europe saw that this was necessary if she intended to maintain and broaden her foreign markets and continue the extension and development of her national life.

As a result, Germany and her European neighbors have directly connected with their industries a great many more technical men than can be found in an equal number of our manufacturing plants.

These economic and social engineers it was who developed the profitable system of pulling a dividend out of the scrap heap.

One of the most glaring instances of our neglect of waste utilization is found in our great coal and coke industry. Year after year its by-products have been thrown away, while Germany's wonderful dyestuff industry has been built almost entirely on this waste.

The aniline dyes and explosives are manufactured from benzol and other by-products of the coke ovens. We have only lately begun making the basic material for these aniline dyes. This is largely because our men have not received the highly technical training accorded those in Europe.

Waste in Antiquated Machinery

Makeshift methods are still used by our manufacturers, who do not realize that in a plant which is not properly laid out or which is equipped with antiquated machinery, the overhead cost is increased and production limited. All of which spells waste.

It must not be thought that American manufacturers are not utilizing some of the waste from their products. In many cases the incentive has come from behind. Appalled at the cost of disposing of waste, the manufacturer has looked around for a means of using it. There are instances of this sort where ultimately the by-products wagged the dog. The meat-packing industry naturally comes to mind. It would be laughable, if it were not in its larger aspects so tragic, to recount the experience of a large copper company. A recent court decision compelled the company to install methods for saving sulphuric acid fumes which were denuding the surrounding country of vegetation and destroying the lands of nearby farmers. As an outcome of this litigation, that particular company is now making large profits by utilizing the sulphuric acid waste.

European countries have been for years installing such methods, not to comply with the law, but as economic assets—as dividend payers. Not only are individuals and industries awakening to the necessity of utilizing the squeal of the pig, but American cities are coming to be less wasteful. The city of New York formerly paid $200,000 a year for removing rubbish. In 1911, a contractor gave it $90,000 a year for the privilege of picking over this rubbish and in addition the contractor removes the material and performs all the labor necessary to trim the scows.

In 1,000 carloads of rubbish an analysis showed 9 tons of tin cans, 30 tons of paper, 16 tons of rags, 9,600 bottles, 47 barrels of broken glass, 3,000 empty barrels, 9 tons of old iron and 1,700 tons of rubber and miscellaneous metals, all of value, yet for years dropped into the deep, deep sea.

For the paper stock there is a steady demand; tin cans are desoldered for the reclamation of the solder and the metal is rolled into sheets from which are punched button-backs; bottles and broken glass are broken up and used in making artificial stone and tile; while empty barrels are sold to commission merchants for use in distributing vegetables.

Again, the garbage contractor for the city of New York to-day pays the city $900,000 for a five year period for the city garbage. This just about pays for the collection of the city's garbage and the contractor must get not only $900,000 out of the garbage, but must make an additional $1,500,000 during the five years in order to get back the cost of his plant. It is safe to say he gets $2,500,000 of grease and fertilizer from what was formerly the waste of a great city.

It is estimated that the city's sweepings of New York are worth $1,350,000 a year, at $2.00 a ton for fertilizer.

Because the city of Washington realized there was in its dump $40,000, it cut down its cost of garbage collection from $68,000 to $28,000.

American Business Must Learn to Make Use of Its Waste

American business must learn to make use of its waste. It is difficult to foretell what effect the European conflict will have on wages of labor, both in Europe and in this country. This in itself will make the necessity of producing by-products important, especially if, in view of history, American wages continue higher than those paid in Europe.

Much is said about industrial preparedness. It should begin at home. Each business man, if he is true to himself and to his country, will see to it that when this country faces new industrial conditions at the close of the war, he will be prepared to meet them. His waste, both economic and social, will be at a minimum; his by-products at a maximum. This will enable us to meet more successfully the avalanche of foreign competition, with its attendant "dumping" demoralization, and its price cutting, that is likely to follow the close of the European war.

Efficiency of Pyrogenetic Blast Burner Due Largely to High Rate of Combustion of Gas in a Concentrated Space

Small Head Room Necessary for Combustion—Adaptability is Wide—Possible to Melt Iron in Flame of Burner —Also may be Used for Heating Liquids with a Boiling Point as Low as Water

By GILBERT C. SHADWELL

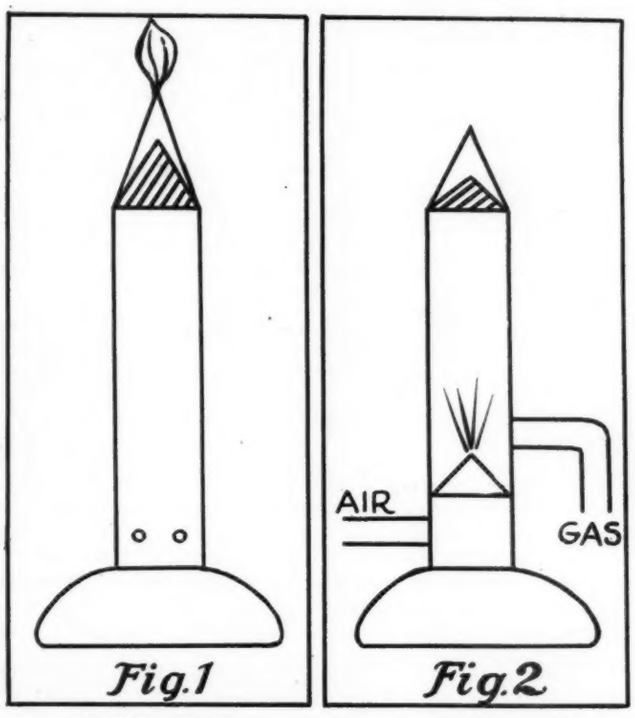
Sales Manager, The Improved Appliance Company, Brooklyn, N. Y.

There has been a very large demand for a long time for a blast burner which would operate efficiently under almost all classes of service.

A burner has been needed which would show a decided increase in efficiency whether for heating liquids having a boiling temperature as low as that of water, or even lower, or for stereo or other similar furnace work. The operation of a blast burner is well known, but, in order that the facts in the evolution of the blast burner described in this article may be properly understood the following facts are briefly recapitulated:

Developments in Burner Types

Figure 1 shows an ordinary Bunsen burner in operation where the velocity of the gas induces primary air at the base, and which completes perfect combustion by obtaining secondary air from all



BUNSEN BURNER SLIGHT AIR-PRESSURE INCREASES

points peripheal to the flame. As the rate of combustion cannot be made a maximum with this type of burner, the flame necessarily assumes a certain length which is undesirable for many purposes, where the head room required for combustion is necessarily limited or where the means for obtaining an adequate and proper supply of secondary air are not at hand.

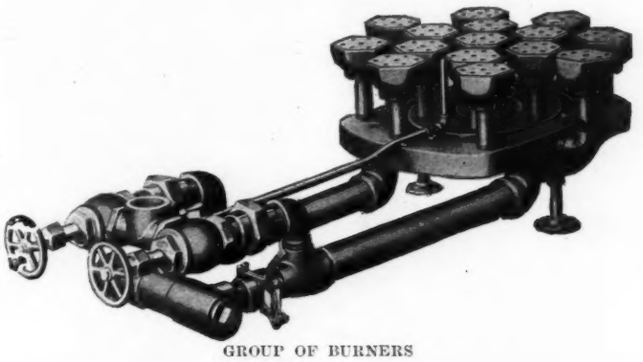
By means of a very slight pressure of air it is possible to increase the rate of combustion very materially. (Figure 2) This will reduce the height of the cone and of the whole flame if proper regulation of the air and gas be made.

This is the case which obtains with the ordinary fan blast burner.

A decided increase in efficiency and all-round convenience is obtained by this modification of the simple Bunsen burner.

The problem which has been faced by gas engineers has been to help further increase this efficiency, and much money and time has been spent in order to effect this end.

Many of the burners which have been evolved have shown decided improvements, but their cost of manufacture has been high, due to the very elaborate points in their construction, and the necessity for extreme care in their application has put them without the range of commercial use except in special cases. There was a notable advance made in the right direction when refractory burners were placed on the market some years ago.

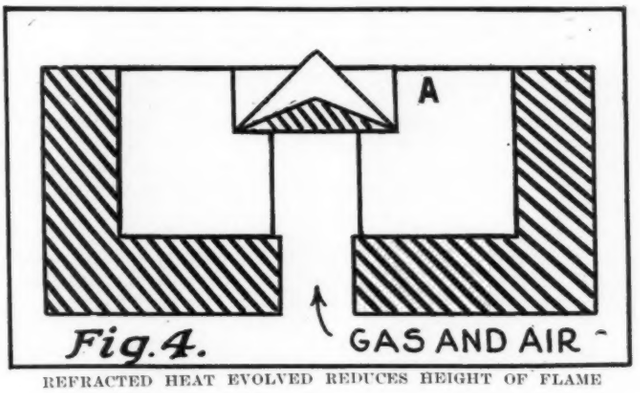


GROUP OF BURNERS

This burner was of the atmospheric type and was made for use where the burner is subjected to intense heat. The top being made of a refractory material, it will endure a high temperature where other burners would rapidly deteriorate. Only one inch head room is required for combustion and thus the top of the burner may be placed quite close to the vessel or other object to be heated. Further investigation along this line is being pursued at this time, but this type of atmospheric refractory burner is proving a desirable one.

The Pyrogenetic Blast Burner

The stage which has brought about the Pyrogenetic Blast Burner (patent applied for) is full of interest. If a refractory material be imagined as being placed round the top of the Bunsen burner shown in Figure 2 it will be evident that the refracted heat evolved will further increase the rate of combustion and will further reduce the height of the flame. This will cause the flame to burn down in the space shown in Figure 4 and in a very short time will bring almost entire incandescence of the refractory



REFRACTED HEAT EVOLVED REDUCES HEIGHT OF FLAME

material in the space at A.

By the use of these burners it is easily possible to show an increase in efficiency over that of other blast burners of from 10 to 50 per cent, depending on the application.

Their high efficiency, then, is due largely to the high rate of combustion of the gas in a concentrated space, to the high heat

evolved and the small head room necessary for combustion in addition to other general principles of design.

Wide Adaptability

Their adaptability is so wide owing to their flexibility that they are particularly suitable for high temperatures such as are obtained in the fire because of a soft metal furnace, and they therefore have a wide commercial value in electrotypers' and stereotypers' work.

Any flame from the softest to the sharpest can be obtained and a very high temperature (about 2900 deg. Fahr.) can be produced when required. In fact it is easily possible to melt iron in the flame of these burners.

On the other hand they may easily be used for heating liquids having a boiling temperature as low as that of water, as mentioned above.

Figure 5 shows an arrangement of 15 hexagonal pyrogenetic heads, arranged for fan blast. Such a group is well adapted for installing under existing stereo furnaces, etc.

The longitudinal type is also made for placing under electro pots or any rectangular electro surface.

Among other examples of the application of these burners may be named the melting of large quantities of asphaltum; their use in chemical plants; under brick furnaces; for lead hardening pots; for oil boiling kettles; for varnish kettles, and other uses too numerous to mention.

In many cases burner deterioration limits the use of the burner. These burners have no limit of application from this cause.

By-Products from American Coke Plants in 1915 Valued at $30,000,000

Large Increase Shown Over High-Water Mark of $17,500,000 in 1914—Increase in Benzol Products Remarkable

The recovery of valuable by-products from American coke manufacture made big advances in 1915, and has now attained the proportions of an important industry.

The value of these by-products last year was nearly $30,000,000, a large increase over the previous high-water mark of $17,500,000 in 1914.

Although there were material increases in the output and value of gas, tar, and ammonia, which was to be expected with a greater output of by-product coke, the increase in benzol products was remarkable and presented the most interesting feature of the year in the coke industry. The value of these products rose from less than $1,000,000 in 1914 to more than $7,760,000 in 1915, according to C. E. Lesher, of the U. S. Geological Survey. Benzol has been recovered in this country from coke-oven gas for a number of years, but prior to 1915 the market was small and the prices low.

Need of Dye Industry Recognized

The awakening of the American people to the need for a dye industry and to a realization that such an industry can not spring full-grown from nothing, but must be fostered and developed is now a well-known story.

Few are aware, however, of the progress that has been made within a year in laying the foundations for future progress in that industry.

Under the spur of almost fabulous prices for benzol products, retort coke-oven plants throughout the country quickly installed elaborate benzol-recovery systems, and now save the valuable oils that not very long ago were being buried or wasted, or, if saved, were begging for a market.

In 1914 there were 14 benzol plants in the United States, but they were all controlled by one company, and therefore it is not feasible to publish the statistics of their production for that or previous years.

Last year 16 additional coke plants were equipped with benzol apparatus, and the output was very greatly increased. The incentive for putting in this equipment was, of course, the opportunity to contract at war prices for benzol and other similar materials for use in making explosives for the European countries.

When the demand from that source shall have ceased, the United States will be in possession of a large supply of the raw materials from which dyes and chemicals are made and will be able, if trade conditions are right, to enter into the manufacture of these essential materials on an ever-increasing scale.

The prompt and successful manner in which, in 1915, under favorable conditions, the producers increased the benzol supply and entered the field of dye manufacturing on a larger scale than ever before demonstrates the fact that in this country technical ability and business courage are not lacking and promises well for the future progress of the industry.

16,600,657 Gal. of Benzol Produced

The benzol products obtained in 1915 amounted to 16,600,657 gal.

More than 13,000,000 gal. of the total output was reported as crude light oil and had an average value of 33 cents.

Some of the plants have their own stills and refineries, and the pure benzol reported from those sources amounted to $2,516,483 gal., with an average value of nearly 57 cents, at least three times the value of crude benzol before the war, and 623,506 gal. of toluol, with an average value of $2.45 a gallon.

Crude benzol, which in 1914 was used to some extent for motor fuel, contained the toluol, which is now separated out and sold at fancy prices.

More than 138,000,000 gal. of tar was obtained from coke ovens and sold for $3,568,384 in 1915.

The ammonia, of which nearly 100,000 tons was reported as sulphate and the remainder as liquor (10,626,612 gal.) and anhydrous ammonia (30,002,196 lb.), brought a total of $9,867,475 to the producers.

Surplus gas to the extent of 84,356,000,000 cu. ft. valued at $8,625,000, was sold or used.

Of that quantity 17,196,000,000 feet was used as illuminating gas, 27,591,000,000 ft. as domestic fuel, and 39,569,000,000 ft. as fuel for steam raising, open-hearth furnaces, gas engines, and other industrial purposes.

These by-products, which had a total value of $29,824,579, were obtained by the carbonization of 19,500,000 tons of coal, from which was also obtained 14,000,000 tons of coke, valued at $48,500,000.

The total value of the coke and by-products was more than $78,300,000.

By-products obtained from coke-oven operations, in 1915.

Product.	Quantity.	Value	Average value.
Tar obtained and sold, gallons	138,414,601	$3,568,384	$0.026
Ammonia obtained and sold:			
Sulphate, pounds	199,900,487	5,648,958	.028
Liquor, gallons	10,626,612	1,240,473	.117
Anhydrous, pounds	30,002,196	2,978,044	.099
Gas produced, M cubic feet	213,667,614	.....	.....
Surplus gas sold or used:			
Illuminating, M cubic feet	17,196,426	3,083,311	.179
Domestic fuel, M cubic feet	27,590,624	3,158,129	.114
Industrial fuel, M cubic feet	39,568,864	2,383,459	.060
Benzol products:			
Crude light oils, gallons	13,082,678	4,304,281	.33
Secondary light oils, gallons	182,039	28,731	.16
Benzol, gallons	2,516,483	1,428,323	.568
Toluol, gallons	623,506	1,529,803	2.45
Solvent naphtha, gallons	196,151	46,233	.24
Naphthaline, pounds	465,865	46,959	.10
Other products*	.....	379,491	.....
		29,824,579	
Coke, short tons	14,072,895	48,558,325	3.45
		78,382,904	

*Includes breeze, retort carbon, domestic coke and coke dust, and aniline oil.

Salaries and Wages Paid by American Manufacturers in 1914 Totalled $5,367,249,000

The salaries and wages paid by American manufacturers amounted to $5,367,249,000 in 1914 and to $4,365,613,000 in 1909, the increase being 1,001,636,000, or 22.9 per cent, according to data supplied by the U. S. Bureau of Census.

The number of salaried employees was 964,217 in 1914, as compared with 790,267 in 1909, making an increase of 173,950, or 22 per cent.

The average number of wage earners was 7,036,337 in 1914 and 6,615,046 in 1909, the increase being 421,291, or 6.4 per cent.

The maximum number of wage earners 7,242,752 for 1914 were employed during March, while the maximum number 7,006-853 for 1909 were employed during November. The minimum number of wage earners 6,640,284 reported for 1914 were employed during December, and the minimum number 6,210,063 for 1909 were employed during January.

By Planning Her Meals Logically Housewife Can Cut Down Gas Bill

Frances Marshall in an article in the *Wilmington News* offers the following suggestions to help the gas-stove cook to keep down the bills for fuel:

Many persons waste much fuel because they do not plan meals properly. If the oven is lighted for baking a shortcake, why not have baked potatoes and perhaps stuffed tomatoes, too, for dinner? There will be no monotony in these baked dishes, yet the same fuel will cook them all.

If there is a roast, plan to utilize the oven heat for vegetables, or for a pie for to-morrow's dinner, or for drying bread for crumbs or croutons or for anything else you can think of.

When you have planned a dinner with stewed meat and boiled peas, plan to cook the rest of the dishes on top of the stove, so that the oven will not need lighting.

Much heat in the gas oven is often wasted, because the oven is not turned off until after the cooked food is removed. Instead, the oven ought to be turned off before the food is ready to take out. If it is not opened, it will retain much heat for four or five minutes, so get in the habit of letting this last heat do its part toward cooking whatever is in the oven. Bread can be finished in an oven from which the heat has been turned off. Some cooks even let bread remain in the oven ten or fifteen minutes after the heat has been turned off.

Always reduce the oven heat when the oven is too hot rather than open the doors to cool it. Turn each cock down evenly, so that the floor of the oven will remain at an even temperature, and remember that once the oven is hot that the gas can be reduced a good deal before it will cool off to any appreciable extent.

One careful housekeeper always places the pots and kettles over the gas burners before lighting them, and she turns off the gas

MRS. MANNIKIN REMINDS HUSBAND THAT HOT WATER SUPPLY IS LIMITED

before removing the pots and pans. If you have ever watched any boiling substance boil after you remove it from the stove you will realize that much heat has accumulated in any dish which has been cooking for a long time, and, therefore, it will continue to cook for many seconds, sometimes a couple of minutes, after the heat beneath is turned off.

Gas Water Heaters Cleverly Advertised at Arlington, Mass.

A recent window display of the Arlington (Mass.) Gas Light Company had as its object the introduction of the Ruud Gas Water-Heater. Mannikins representing a man and his wife were shown in the act of preparing for a bath. On one side of the window an old style stove was the source of the hot-water supply,

DISPLAY ATTRACTED MUCH ATTENTION AND RESULTED IN A NUMBER OF SALES

which the wife reminds her husband is limited in quantity. Opposite, a Ruud Heater is ready to supply hot water in unlimited quantities.

The display attracted much attention and resulted in a number of sales.

Petroleum Production in 1915 Breaks All Records

The quantity of petroleum marketed in the United States in 1915 amounted to 281,104,104 barrels, valued at $179,462,890. More crude petroleum was marketed in the United States in 1915 than in any previous year in the history of the industry—nearly a 6 per cent increase over that credited to 1914, and about 5 per cent in excess of the estimated total made public by the Geological Survey on January 1. The average price received at the well for this output was 64 cents a barrel.

Fire Brick Production in 1915 Showed $2,412,384 Increase in Value Over that in 1914

The value of the brick and tile products of the United States in 1915, according to the United States Geological Survey was $125,794,844. Fire brick, valued at $18,839,931, showed an increase of $2,412,384, or 15 per cent increase in value over the 1914 production.

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Hiring Men for Political Reasons

As a reason for not starting on some repair work which it is being urged by city authorities to undertake, a gas company not far distant from New York City has pointed out existing labor conditions, and its inability to secure men.

"I doubt this," states a city official, "as I have sent them men myself, and they have turned them down for some reason or another."

Wonderful! Evidently that official has not yet learned that the employment of men by public utilities for political reasons is a practice that has long since been generally discarded.

It did not pay.

We wonder, though, to what extent this official's assiduity in the public's interest as is manifested in his eagerness to jack-up the company in its repair work, is inspired by its act in refusing the men he has sent.

It is to be hoped his activities will not have the effect in the end of forcing the company to sacrifice a principle it has evidently established.

This ancient abuse of hiring men for political purposes is far too expensive to be again generally adopted. For years public utilities and municipal contractors accepted it as a disagreeable necessity. It became too general and too costly, and they began to study the matter more closely.

They learned that the wasted wages paid to the political protegees did not by any means represent the total cost to them.

The very presence of such idlers on the work demoralized the whole organization. Good men were spoiled and discouraged by the sight of these others drawing the same rate of pay, and doing nothing.

It would have been cheaper to have paid double the amount of money paid to these men and to have kept them away.

Such were the reasons for the practice falling into disuse. Those companies, who felt that it was necessary to pay some sort of political tribute, came to the conclusion that it would be better to pay it in some form less costly, and less destructive to efficient organization.

Unreasonable Charges for Pavement Restoration

In some cities highway departments insist upon making pavement restorations cover street openings by their forces. There would be no objection to this course if the work was done at a cost as low as private contractors or corporations could do it. But, unfortunately, this is quite often not the case.

In one case in mind the charge is one dollar per square yard for granite block on sand pavement. The only material that has to be bought in this case is the sand. The old blocks are used. At the present cost of labor this work could be done with a profit at sixty cents per square yard.

The balance represents either additional and unreasonable profit to the municipality or, what is even more reprehensible—sheer waste.

For granite block pavement on a sand foundation a charge of three dollars is exacted. The foundation should cost not more than one dollar per square yard. In this case the old blocks are also used. There is an additional cost, however, in the joint material, which is tar and gravel.

A liberal estimate of the cost of the entire work should fall well under two dollars per square yard, leaving a dollar or more per square yard to be accounted for, but which the street opening company or individual never sees.

Such charges are unjust and uncalled for. City ordinances authorize them, but the ordinances are not infallible. It would seem reasonable to suppose that under a severe test they could be upset.

In certain conditions, where the original constructor of the pavement is held by a maintenance clause for a certain number of years, there is a fixed sum charged to every one for pavement repairs. Even the city has to pay these charges, and have that particular concern attend to the restoration.

In the particular locality we have in mind there is an almost humorous incongruity. Fo rreplacing asphalt block on a concrete foundation a charge equal to the charge for granite block on concrete is made. In this case quite a large proportion of new blocks must necessarily be supplied and the cushion is of dry sand and cement mixed, both costs that are additional to those of the granite pavement, yet the latter costs just as much for restoring.

Incidentally it may be mentioned that the asphalt company gets but two and one-half dollars for restoring the pavement for which the city exacts three dollars.

Gas companies are continually seeking new means of effecting economies. A very large one could be effected by looking closely into pavement restoration matters, and by insisting upon just charges or the right to do the work themselves.

The Status of the Engineer

Within the past few years there has come into prominence in the daily press a class of journalist known as the "columnist." This is a species of feature writer who generally fills a column on the editorial page with half caustic and half humorous comment on the foibles and vanities of mankind.

Recently the president of a large corporation had occasion to call the chief engineer on the telephone.

"Hello Blank!" called the executive. "This is Mr....."

A small incident, truly, but a keen-witted "columnist" caught the incongruity of it.

The executive who made the slip is a big man in the financial world. His is a constructive mind of no mean calibre. Because of his wide vision, undoubtedly his company has progressed in a few years to a point that might not have been attained in many years under different management. But, on a broad scale, the engineer is an equally big man, perhaps bigger. His work and that of his staff made possible the progress the corporation has made, for it has been progress that has been necessarily based entirely on advanced technical knowledge and especially difficult construction. So well is that engineer esteemed by his fellows that they elected him president of the national engineering association that covers the field devoted to his line of work.

Between these two men there should be no fine distinction of terms. If one should have the formal prefix "Mister" ahead of his name, so should the other. As spoken, the tone of the executive was that of the employer to the employee. In this case it was all wrong, as both are officials of one corporation, and there is little difference in the importance of their offices to the welfare of the company.

But it is a distinction too often used. The reason is the failure of the engineer to establish and insist upon his rightful status in the world's affairs. There was a time when the engineer was regarded generally as an especially skilled mechanic. That time is so far back that it is almost forgotten. To-day engineering is acknowledged as a profession. The fact that the engineer of prominence is not accorded the same attention and deference before the public as the great statesman, the eminent lawyer or the successful physician is attributable mainly to the engineer himself, and to the societies that should exact it for him.

Are the Gas-Electric Companies Seeking to Kill the Gas End of Their Business?

The statement has been made by various visitors to the office of the AMERICAN GAS LIGHT JOURNAL that many of the gas-electric companies are endeavoring to kill the gas end of their business, and to supplant it with the electric. We do not, can not, believe this statement is to any large extent founded on serious consideration. To do so would be to doubt the foresight and intelligence of the managements of these companies.

As has been pointed out many times in recent issues of this journal, the gas industry has its best days ahead of it. Its future is brighter than it ever has been before. It is by no means a dead industry.

The electric industry has made giant strides. But it has by no means crowded out gas, and, judging from present indications, it never will, or can—even in the lighting field.

Assume then, for instance, that in a certain town there was a gas-electric company with a management so short-sighted that it deliberately killed the gas end of its business for the enhancement of its electrical business, and had influenced the people to replace their gas fixtures with electric.

Sooner or later there would come to that town some speculative individual, with a working knowledge of relative costs, who would point out to the people the high cost of their lighting and their domestic fuel.

He would illustrate to them the splendid light shed by the latest development in gas lamps, and cite Government figures to show their economy over electricity. This latter would be a most potent argument.

So long as existing social conditions endure, there will always be a large proportion of the world's population which will figure a saving of even a small part of a dollar on the month's lighting bill an important factor.

Particularly so, as long as the only relative convenience of electricity for house lighting as against gas, is represented by the greater effort of raising the arm to pull a string as against the energy required to extend the arm to push a button set in the wall. Likewise he will display the latest improvements in gas ranges and water heaters; always harping on the economy to be gained.

The result will be that the speculative individual will get a gas franchise, and sufficient customers to justify him in building a gas system. The former gas-electric company—now entirely electric—will find itself confronting a sharp competition. Gas will be in the field with electricity; not a gas company under a management to whose interest it is not to let the cheaper commodity cut into the business of a more luxurious one, but gas under a management whose profit would lie to a large extent in the nearest possible approach to the absolute extermination of the rival fuel.

This journal believes that in the intelligently managed gas-electric companies, the development of each commodity in its most efficient uses is impartially promoted. It believes that they are not seeking to destroy the gas end of the business through mere motives of keeping out a possible active competitor. But it would be the height of wisdom not to kill the gas end, if only from "dog-in-the-manger" motives alone.

Encouraging the Educated Young Man to Enter the Gas Field

It is estimated that some 5,000 young men received electrical degrees from the colleges and technical schools of this country in June. Many of these men are now taking student courses in the plants of the manufacturers, or cadet courses at the schools of some of the large central stations or holding companies.

In this way thousands of well trained energetic young men are being brought into the electric lighting business each year. Many of these men have no money or influence. They do have, however, an immense amount of energy, and a determination to make their way in the world. They are doing much to bring about the rapid growth that is taking place in the electrical industry.

What is being done to attract such men to the gas industry? How many of them are devoting their lives to the advancement of the gas-making art and its countless offshoots? To-day more than any other is the day of the educated man. The day of the apprentice system of training employees has passed. We must either establish costly schools of our own or we must make the greatest possible use of the present educational institutions.

Would it not be a good idea for gas companies to establish more finishing schools for college graduates; for the manufacturers to do likewise, and for all to show the college man that there is as great a future in the gas business as there is in the electrical business? The fact that so many more go into the latter than into the former would indicate that at the present time they consider the electrical field a much more promising one than the gas field.

At the present time the gas industry offers greater opportunities to the young well educated man than it has ever offered before.

In the chemical end there are great problems to be solved. Among these is the problem of making a better and a more profitable disposal of the by-products.

In the engineering end there are also great problems to solve. Among them is the problem of considerably increasing the distribution pressures, possibly even the pressure at the appliance, and thereby lowering the cost of distribution.

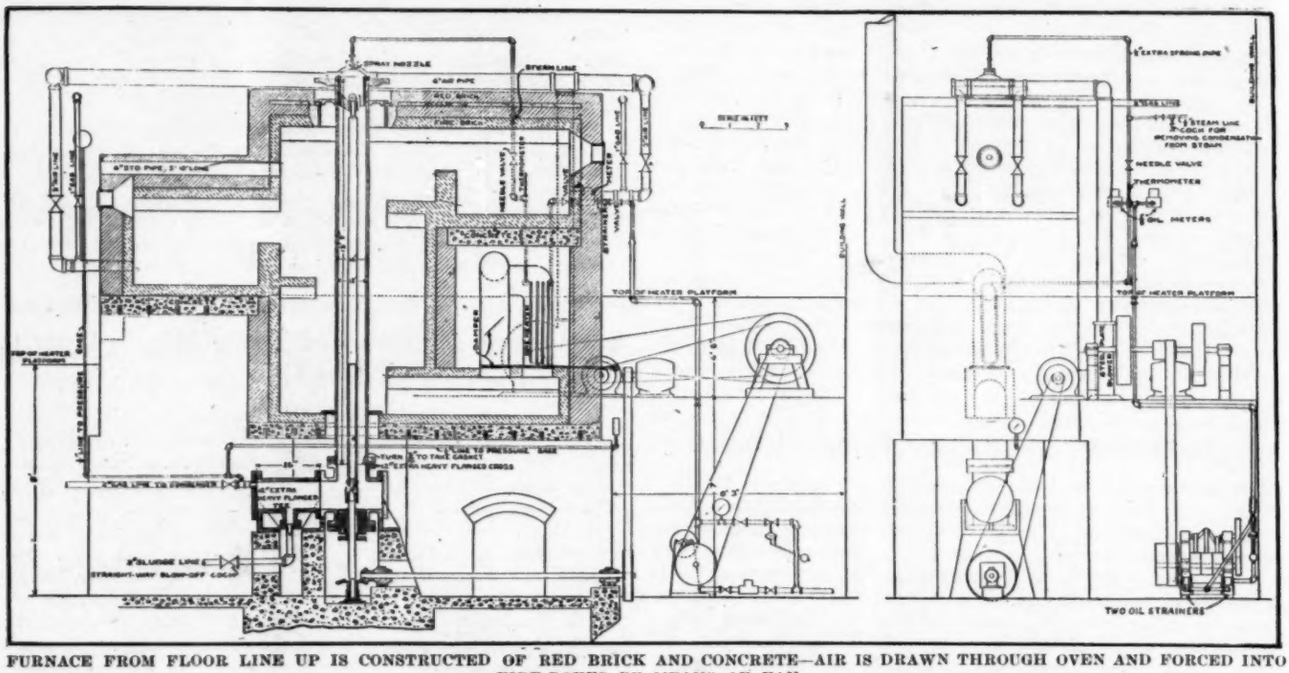
In the commercial end there is keener competition than there has ever been before, and in the future very much better business judgment will have to be used than has ever been exercised in the past.

Surely there is a bright future offered the educated young man in the gas field. Unfortunately though, it has not been properly pointed out to him. The result has been, and is, not only the educated young man's loss, but the loss of the gas industry as well.

Describes Gas-Fired Furnace for Manufacturing Gasoline by Rittman Process

First Furnaces Constructed in Development of Process Were of Multiple-Tube Type—Difficulties of Maintaining Even Temperature Throughout Have Caused Number of Tubes to be Successively Reduced

The most favored type of furnace construction for the production of gasoline by the Rittman process is the single tube type. The first constructed in the development of the process had as many as 10 tubes placed in a single heating chamber, but, owing to the difficulties of keeping up a uniform temperature throughout the number of tubes has been successively reduced. The following description of the construction of a gas-fired, single tube furnace, by C. P. Bowie, has recently been published by the U. S. Department of the Interior.



FURNACE FROM FLOOR LINE UP IS CONSTRUCTED OF RED BRICK AND CONCRETE—AIR IS DRAWN THROUGH OVEN AND FORCED INTO FIRE-BOXES BY MEANS OF FAN

Constructed of Red Brick and Concrete

The furnace is 17 ft. 1¼ in. long by 6 ft. 3 in. wide, by 17 ft. 1 in. high. This size of furnace has given satisfactory results, and it is recommended that these figures be adhered to as nearly as possible if gas is to be used as fuel. In one or two instances the channel-iron buck stays have been replaced by single angle irons. For permanent construction, however, this can not be considered good practice.

The furnace, from the floor line up, is constructed of red brick and concrete, reinforced with angle irons, and is lined with fire brick. It is fired simultaneously from the front and the rear, the rear fire-box being a little higher than the one in front. The purpose of this arrangement is to get as even a temperature as possible on the tube. Above the front fire box is a 6 in. piece of pipe, intended for the terminals of a pyrometer, which extends through the inner heating chamber. The draft is downward. The exhaust gases are allowed to escape through an opening in the back wall of the furnace close to the bottom, where they enter a flue which passes through a brick oven constructed immediately under the rear fire box.

The oven has solid brick walls on three sides, but the fourth side is only loosely bricked. Its function is to heat the air that is used in the fire boxes. The air is drawn through the oven and forced into the fire boxes by means of a fan. This effects a considerable saving in fuel.

Furnace Intended to be Gas-Fired

The furnace is intended to be gas-fired. It is probable that slight modifications in the construction of the fire box will be necessary if fuel oil is used.

The lower part of the flue is a casting made in the shape of a long, sweep ell, on the short leg of which is a damper. This casting could, no doubt, be replaced by a brick flue, leading to the base of the stack. The stack should be provided with the usual dampers.

The first furnaces constructed in the development of the process were of the multiple-tube type, as many as 10 tubes being placed in a single heating chamber. The difficulties, however, of maintaining even temperature throughout such a furnace, have caused the number of tubes to be successively reduced, until to-day the most favored type of construction is a single-tube furnace.

Tube and Tar Pot

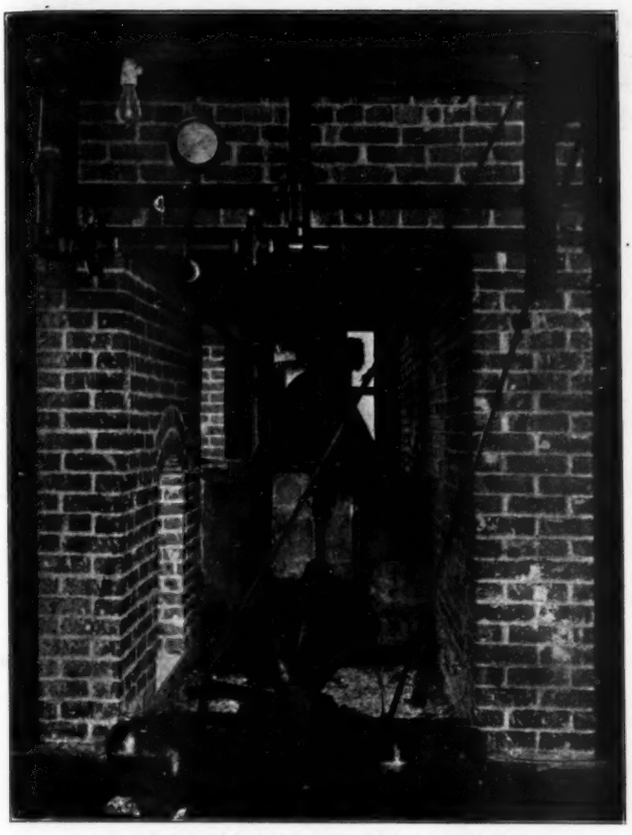
The most satisfactory results are being obtained from tubes 13 to 14 in. in outside diameter, which are made of steel, lap welded, and have walls approximately 1 in. thick. Stock fittings can be used for a tar pot with the 14-in. tube, but a special casting is required if the 13-in. tube is used. The tubes are standard size, and can be obtained from any of the larger tube mills.

The top and bottom of the tube are fitted with cast-steel flanges. Up to the time of writing these are made with parallel threads, six threads per inch, but there is no reason why they could not have the standard pipe thread, eight per inch, provided the flange is always made up loosely. The cover for this tube is also a casting made with a stuffing box and gland. These castings can be made by any properly equipped foundry.

On the bottom of the tube is a tar pot. This has always been a special casting and has varied in form. The tar pot contains three essential features; it must be fitted with a stuffing box and gland for the stirring-rod shaft, it must allow easy removal of carbon and tar and must be heavy enough to withstand the required pressure.

In the inside of the tube at the top is a cast-steel basket. This was intended to serve the double purpose of a bearing for the upper end of the stirring rod and a receptacle for steel balls or angular pieces of metal, over which the oil on entering the tube would pass in a thin film, causing rapid evaporation. Spray nozzles, however, are being used and are found to be more effective than either balls or angular pieces of iron. Some such basket device is necessary, however, to provide an upper bearing for the stirring rod.

On the lower part of the stirring rod is a cast-iron paddle, which is intended to prevent the carbon from building up on the



STIRRING ROD DRIVE AND END OF TAR POT

ledge made by the stuffing box and choking the neck of the tar pot, and to prevent grit from getting between the stirring-rod shaft and liner.

Machinery Used

The machinery generally used for operating such a plant consists of a small steel-plate planing-mill blower which furnishes hot air to the fire boxes, as previously stated, and a small power pump capable of delivering oil under a working pressure up to 300 lb. per square inch. There will also be required the necessary pulleys and shafting and two 5-horsepower electric motors, one to drive the blower and pump and one for the stirring rod. It is believed that such a machinery equipment is sufficient to operate a battery of six single-tube furnaces. Steam, of course, can be used as a motive power if desired. The relative positions of the various parts of machinery are shown in the accompanying drawing.

Preheater For Oil

To facilitate vaporization of the oil a preheater is provided. A special type of hot-water heater is being used for this purpose, through which the oil is passed, where its temperature is raised from normal to 200 deg. Fahr. or higher. Such an arrangement is expensive, because of the high first cost and the fact that gas must be used for fuel. It is suggested that a cheaper and more satisfactory preheater could be arranged by passing the oil through coils heated by the flue gases. A heater of this kind made on the principle of an economizer is shown in the accompanying drawing.

The essential thing is operating such a heater would be to so regulate the temperature by manipulating the dampers that the oil in the heater would not become too highly heated and gasify or coke. Although the use of flue gases has not been tested in actual practice, it is believed that such a heating system could be arranged to give satisfaction.

The ordinary box type of condenser is being used. Condensation takes place at practically atmospheric pressure, a pressure-reducing valve being placed in the vapor line close to the carbon pot. The pressure, however, can be carried through the condenser if desired. It may be found advisable to have a separate condenser coil for each tube.

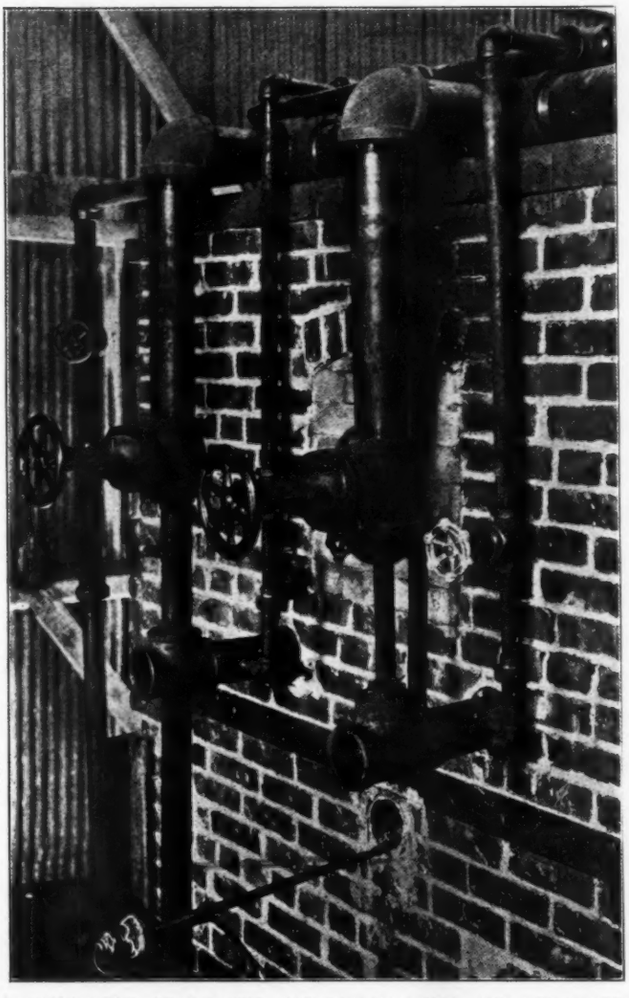
Pipe and Fittings

The pipe and fittings from the pump discharge to the condenser box should all be extra strong and should withstand a test pressure at least twice as high as the pressure at which they will be operated. If pressure is carried on the condenser, the tubes of which it is composed should also be extra strong.

The suction pipe of the pump is 2 in. in diameter and contains a strainer through which the oil passes before entering the pump. The discharge pipe is 1½ in. in diameter. These sizes of pipe for suction and discharge will probably be large enough for a battery of five single-tube furnaces. Between the discharge and the suction is a by-pass which contains an automatic relief valve that can be set at the pressure desired to be carried and will permit the oil to by-pass into the suction when this pressure is exceeded.

From the pump the oil passes through the preheater coils, which are one-half inch in diameter, thence through a strainer, a meter where the amount of flow is measured, a needle valve used for regulating the flow, and into the cracking tube. In the first installations meters were not used, but they have since been found very valuable, because they will indicate by a diminished flow any clogging of the system. Moreover, they furnish a means of determining definitely the amount of oil entering the tube.

The meter has heretofore been placed between the preheater and the tube. There is no reason, howver, why the meter should not be placed on the cold side of the preheater, as shown in the accompanying drawing, provided a separate heater is used for each tube.



ARRANGEMENT OF AIR AND GAS SUPPLY LINES, AND PYROMETER ROD

Items of Interest from Various Localities.

Finds Dallas Gas Company Profits Not Too High, Yet Would Reduce Rates

Prof. Bemis Submits Final Summary on Gas Question in Texas City—Average Profits During Last Ten Years Do Not Justify a Demand for Lower Returns to Company

The average profits of the Dallas Gas Company for the last ten years under the present franchise do not justify a demand for lower returns to this company, although, if the liberal profits of the last three years continue the city might consider this subject again two or three years hence.

This finding is reached in the final summary on the gas question in the Texas city, submitted by Prof. Edward W. Bemis.

"In this report, however," he adds, "a plan is suggested by which, through a readjustment of rates, the Dallas consumers, in the aggregate, can secure a material reduction of rates even under the present contract with the Lone Star Company and with no reduction of the profits to the Dallas Gas Company."

In the chapter on the Lone Star Gas Company, Prof. Bemis says in his letter of transmittal of the report, "it will be shown how that company could reduce its charges to the five distributing companies sufficienty to enable them to reduce the net maximum price to the domestic consumer for the first 10,000 ft. a month from 45 cents net to 35 cents net per 1,000 ft., and for the next 5,000 ft. from 40 cents to 35 cents even if the distributing companies should not be asked to accept a lower profit than now on their part in the work of distributing the gas received in bulk at or near the city limits to the various consumers' meters."

Dallas Gas Assets

The report finds that the Dallas Gas Company has total assets of $1,605,576.98. On this sum the company made in 1913 an earning of 12.25 per cent, in 1914, 12.37 per cent, and, in 1915, 11.71 per cent, but these earnings were outside of depreciation. Deduction of depreciation brought the real profit down to 9.51 per cent in 1915, with slightly higher returns for the latest modern years considered.

"This profit," the report declares, "is sufficiently large to justify a reduction of the charges were it not for the small profits obtained from 1905 to 1912."

For the ten and one-half years since the organization of the Dallas Gas Company, the period covered by the report, the average net earnings did not give a 6 per cent return on the actual investment, and he indicates as his belief that the distribution concern should be allowed to make up now, when it is prosperous, for the "lean years."

Nine-Year Contract

Incidentally, it is shown in the report, that the present contract of the Dallas Gas Company with the Lone Star Company expires in 1925, having nine years yet to run.

How the maximum net domestic rate could be reduced from 45 cents to 40 cents without disturbing in any way the existing contract between the Dallas Gas Company and the Lone Star Gas Company is shown in detail in a lengthy section of the report.

Circulars in Chinese Have Disadvantages as Well as Advantages

The Denver Gas & Electric Light Company, operated by Henry L. Doherty & Company is now in the midst of a washing machine campaign. In order to interest the Chinese laundryman in the machine, the Denver Company had circulars printed in Chinese, telling of its advantages, etc. All went well until one representative ran against a snag, which was the price of the machine, f. o. b., Chicago. The Doherty representative could not, after many trying moments, explain the difference. He finally found some one who could, and expects to land the business.

Lone Star Gas Company Criticises Report of Prof. Bemis

As soon as officials of the Lone Star Gas Company have had an opportunity to study the report of Edward W. Bemis it will be answered in a statement setting forth the company's side of the matter, according to George G. Greer, general attorney for the Lone Star. Enough of the report has been studied, Mr. Greer said, to see that it contains numerous errors. Mr. Greer made the following statement:

"I received a copy of Dr. Bemis' report on the gas question this morning. It is an exhaustive document and I am having it copied with the view of making a careful study of it.

"As yet I have had an opportunity only to read the extracts from the report and the statements concerning it appearing in the newspapers, and to examine hurriedly portions of it.

"Enough has been seen, however, to make it plain that Dr. Bemis' report, like his accountant's, contains numerous errors and a reply is necessary. Some of these errors concerning the investment, earnings and other matters are glaring and it is difficult to understand how they could have been made.

"As soon as possible we will make a careful study of the report and in due time make reply so as to put the important facts properly before the public. I am not prepared, and it is not my purpose now, to make detailed comment, but I deem it appropriate to call attention to the figures from a table appearing in this report, which accountants probably can understand, but which an ordinary man, I believe, can not. This statement, accepted and interpreted, as the ordinary reader would, might produce a very injurious misunderstanding on the part of the public."

Work Stops on Estherville, Va., Gas Plant

Work has been stopped on the construction of the Estherville, Va. gas system. It is said that lack of funds is the reason for the stoppage. A movement is on foot to reorganize the company with local capital. Forty-seven blocks of mains had been laid up to the time the work was stopped.

Davenport, Iowa, High Pressure System Giving Satisfactory Results

The new high pressure gas system recently installed by the Peoples Light Company at Davenport, Iowa, was given its first practical test July 23, and proved satisfactory in every respect.

The "booster" is located at the gas plant. There are two governing stations, one at Fourteenth and Main streets and another at Fourteenth and Grand avenue. These are located in manholes constructed under the street.

These governors work automatically and maintain a uniform pressure in all parts of the city at all times. There is no fluctuation such as has in the past decreased the efficiency of the service.

It is announced more governing stations will be constructed as the system requires them. The cost of the present ones was $16,000.

Gas Lighting Companies Offer to Bid on All Street Lighting in Salt Lake City

A form of advertisement for bids under which the Utah Gas & Coke Company and the Welsbach Street Lighting Company may compete for the business of lighting either a part or all of Salt Lake City in competition with the Utah Power & Light Company, was presented to the city commission Aug. 2, by R. W. Bingham and C. M. Eyman, representing the gas companies.

Under the new form the gas company may, if the city decides to advertise for alternative bids, bid on from 250 to 3,000 street lights. Mr. Bingham said that while the gas company wishes only a share of the street lighting business in the city it is prepared to bid on the whole contract if that is the only way it can enter the field.

DELIVER 24 CU. FT. OF FREE AIR PER MINUTE FOR TESTING

Right of Toronto Gas Company to Payment for Moving Mains Sustained

Another defeat was sustained by the City of Toronto, Canada, in its endeavor to escape paying for the moving of gas mains for public works construction, when the Privy Council, the highest court in the British Empire, upheld the decision of the Appellate Court, which was in favor of the gas company.

The city's claim was that when a street improvement was undertaken by the city, and gas mains had to be removed, they should be removed at the expense of the company, not of the city.

Judge Winchester, in trying the issue, decided in favor of the city. The Appellate Court reversed his decision. Then the city appealed to the Privy Council.

The case at issue in the test suit means about $10,000, but as it will stand hereafter as a precedent it means that all the expense of moving gas mains when they interfere with street improvements must be borne by the city.

The news of the defeat came in a cable message to Acting City Solicitor Colquhoun from the city's legal agents in London.

Cut Gas Rate at Menomonie, Wis.

The Menomonie (Wis.) Gas Company has announced a reduction in its basic rate of from $1.50 to $1.30 per thousand feet. Permission has been given the company to apply this rate beginning Sept. 1, by the Railroad Commission of Wisconsin. The only condition is that the bill be paid by the 10th of the month following the month in which the gas was used. Manager H. D. Mitchell says that this will mean a saving of $2.40 a year to most of the consumers. Hitherto the rate has been $1.50 for the first thousand and $1.30 for each thousand used thereafter.

Another change is that a minimum charge will be made of 50 cents a month. Hitherto there has been a large number of bills running for small amounts and these will be done away with under the new plan.

This announcement is the first official act of the new owners of the Menomonie Gas Works. The property has been sold by the Consolidated Gas, Electric & Water Company of Lansing, Mich., to the Continental Securities Company of Cleveland, O.

Much Ado About Nothing at Newark

A new rate for gas lamps was submitted to the Board of Works of Newark, N. J., by the Public Service Gas Company, Aug. 3.

It called for gas at $10 a lamp. With $10.60 for maintaining the lamps, as bid by the Public Lighting Service Corporation of New York, this would make each lamp cost $21.60 a year. The original bid of the Public Service for gas, and for maintenance, which has been the cause of a lengthy controversy, was $23.75.

Portable Compressor Used For Many Purposes On Gas Main Construction

Makes Possible a Great Saving Over Hand Drilling in Rock Excavation, Saves Labor in Calking, Supplies Air for Testing, and Furnishes Power for Tamping

The small portable compressed air outfit illustrated herewith can be put to manifold uses in gas main construction. The pneumatic hammer is superceding, to a large extent, hand labor in the calking of bell and spigot pipe.

A portable air compressor of so small a size as the one shown has many advantages as a power producer for the calker's tools. It weighs but 1,200 lb., and can be easily drawn about the work by laborers. It has a capacity of 24 cu. ft. of free air per minute, and a speed of from 250 to 550 revolutions per minute. It will run on either gas or gasoline. The consumption of the latter amounts to from 4 to 5 gallons per working day. The machine is simple to start and operate, and, after starting, requires very little attention.

Used in connection with rock-drilling in trench work, it will operate a drill for holes up to 6 ft. deep and will do the work of four or five gangs of hand drillers, numbering three men each. The speed of drilling is, of course, dependent upon the nature of the rock.

On pipe testing, this outfit, delivering 24 cu. ft. of free air per minute, will fill up a line very quickly. One company, which had a long line to test, had a watchman look out for the outfit during the night, and, in the morning, the pressure was in the pipes and no time was lost.

A 12 in. pipe, one-half mile in length can be pumped up to 20 lb. pressure by the machine in little more than an hour's time.

In steel pipe construction, or in boiler repairs, or similar work, it can be used to supply power for the riveters; likewise for clippers, drills, reamers, etc., on structural steel work.

It can also be used for paint-spraying and water-proofing, wood boring, and for concrete finishing.

The compressor described is the product of Chris. D. Schramm & Son, of Philadelphia.

COMPRESSOR FACILITATES TAMPING

Scarcity of Labor Delays Completion of Muskegon Heights, Mich., Plant

The scarcity of labor has delayed the completion of the plant of the Muskegon Heights Gas Company. That corporation had planned to start the service by the first of August, but although crews are working night and day installing machinery, the opening will probably be delayed for another week.

Oklahoma City School Commissioner Favors Gas for School Heating

"If the gas company can guarantee efficiency and economy in a contract, I believe the school board will favor gas over coal for this winter's fuel," R. J. Edwards, school board president of Oklahoma City, Okla., is quoted as stating: "The board is not playing favorites on the fuel question; it is simply a matter of dollars and cents."

Chicago's Mayor Signs Contract with Prof. Bemis

Mayor Thompson of Chicago, Aug. 3, signed a contract with E. W. Bemis to make an investigation of gas rates for the city.

Several changes were made by the Mayor in the contract. Comptroller Pike explained that these changes would save the city about $35,000.

It was asserted that Mr. Bemis' renumeration for his aids was too high, and that this was scaled down to meet the usual scale paid by the city for such work.

Gas Irons Featured by Boston Company

The Boston Consolidated Gas Company is conducting a campaign for the sale of the "Iwantu" Gas Iron, which it is selling at $3.50 cash, with stand and 6 ft. of tubing; or $3.75, payable 50 cents on delivery and three monthly payments of 75 cents, and one of $1. Connection to a gas range is made without charge, and on a wall outlet $1.50 is charged.

It is claimed that the cost for gas is only about one cent for three hours' ironing—about 20 per cent of what it costs to heat by any other method.

The double-point feature of this iron allows plaits and tucks to be ironed with backward as well as forward motion, doing twice the amount of work with the same labor. The Boston company has already sold a large number of the irons.

St. Louis Aldermen Present Findings

Much valuable information is emanating from St. Louis these days. It appears that certain members of the Board of Aldermen have taken exception to the agreement entered into by the Mayor of the city and the Laclede Gas Light Company, whereby the product of the latter is tested according to the heat unit standard instead of the candle power, as has hitherto been the case. Some time ago the startling disclosure was made that the heat unit gas that the company was sending out did not of itself contain the same illuminating value as the former product did. The latest discoveries—as made in St. Louis—are contained in the following extracts from the report of the Board of Aldermen's special committee of investigation.

The report of the committee, summed up, finds that the new system of serving "dry" gas instead of "wet" gas, at a reduction in the rate from 80 cents to 75 cents a thousand cubic feet, will work no saving to the consumer; that it will result in a bigger profit to the company; that it will mean inferior gas; that it will require the almost universal use of gas mantles, at an expense to the consumer, and that it will produce less candle power than the present system.

It further points out that whereas the new system will result in an increase of earnings of 8 per cent to the company, it will mean only a 6 per cent saving to consumers, under the most advantageous conditions; that under the old ordinance, which expires in 1920, the company was required to furnish at least 600 thermal units, whereas under the new system it must furnish, within a mile of the manufacturing plant at most, 570 miles, and not less than 520.

Personal Notes

G. P. EGLESTON has been appointed business agent for the Coast Counties Gas & Electric Company at Santa Cruz, Cal.

JAMES T. LYNN, president of the National Gas, Electric Light & Power Company has been made president of the Public Lighting Commission of Detroit, Mich., succeeding Charles H. Bryan.

GEORGE SUMMERS, recently chief engineer of the Citizens' Gas Company and now its consulting engineer, has opened offices at 904 Hume-Mansur Building, Indianapolis, Ind., for practice as consulting engineer, appraiser of public utilities and efficiency expert.

W. R. PIGG, of Berkeley, Cal., has been elected vice-president and treasurer of the Central California Gas Company.

R. B. BROWN has been re-appointed general manager of the Milwaukee Gas Light Company.

H. H. COREY was recently appointed a member of the Oregon Public Service Commission.

J. B. CRAWFORD has been appointed assistant commercial manager of the Wisconsin Gas & Electric Company of Kenosha, Wis.

JAMES M. DAILY, treasurer and general manager of the Pueblo Gas & Fuel Company, Pueblo, Col., was recently elected treasurer of the local Rotary Club.

PHILIP H. DAWSON has resigned as assistant gas expert of the Ohio Public Utilities Commission, to accept an appointment on the forces of the Ohio Fuel Supply Company.

L. L. CADWALLADER has resigned as manager of the Kennebec Gas & Fuel Company at Waterville, Me., and will hereafter be located in New York City.

W. H. FRITCHMAN, of New York City, has been appointed managing director of the Kennebec Gas & Fuel Company at Waterville, Me.

BENJAMIN J. MCDONALD of New York City has been appointed office manager and superintendent of the Kennebec Gas & Fuel Company at Waterville, Me.

A. M. EWING, who has been in charge of the Lawrence Gas Company interests at Lawrenceville, Ill., will have charge of the Meter Department of the company at Vincennes, Ind. He will have charge of all the towns concerned in the company's business.

RALEIGH CLARK, for the past six years in charge of the Olney, Ill., Gas Company, has been appointed to have charge of the Lawrenceville, Ill., company, succeeding A. M. Ewing, whose appointment to another position is noted elsewhere in these columns.

CHARLES H. GARFIELD has resigned as superintendent of the Webster & Southbridge Gas & Electric Company, Southbridge, Mass., after eighteen years of service.

SHELDON J. GLASS, was re-elected vice-president at the annual meeting of the Milwaukee Gas Light Company, Milwaukee, Wis.

EDWARD A. HARRIS is now office manager of the Montpelier & Barre Light & Power Company, Montpelier, Vt., succeeding W. H. Phillips, deceased.

C. W. HEYD, of Harrisburg, Pa., has resigned his position as secretary-treasurer of the Kent County Light, Heat & Power Company of Smyrna, Del.

GEORGE F. HOWLAND, for the past six years assistant treasurer of the Massachusetts Lighting Companies of Boston, Mass., is now treasurer of the company, succeeding A. C. Whitney.

ALANSON P. LATHROP has been elected president of the Milwaukee Gas Light Company, Milwaukee, Wis.

M. G. LLOYD was elected vice-president of the Illuminating Engineering Society, at a recent council meeting.

WILLIAM E. LUCE, for many years connected with the Pacific Gas & Electric Company at Richmond, Cal., is now located at Reno, Nev.

J. D. McDougall has been appointed manager for the Marquette County Gas & Electric Company at Negaunee, Mich.

W. Cullen Morris was elected vice-president of the Society of Gas Engineering of New York, at their annual meeting.

Albert D. Quinn has been elected secretary-treasurer of the Kent County Light, Heat & Power Company of Smyrna, Del.

C. J. Ramsburg has been elected vice-president of the Pittsburgh By-Product Coke Company of Pittsburgh, Pa.

H. B. Rust has been elected president of the new Pittsburgh By-Product Coke Company of Pittsburgh, Pa.

William J. Serrill has been elected president of the Illuminating Engineering Society.

Fred Slater has been elected vice-president and general manager of the Texas Power & Light Company, Brownwood, Tex.

Charles E. Smith, formerly connected with the Knoxville Gas Company of Knoxville, Tenn., is now head of the sales department of the Washington County Gas Company of Johnson City, Tenn.

J. K. Somers, who has been stationed at Santa Anna, Cal., has been appointed manager of the Southern Counties Gas Company of Long Beach, Cal.

George E. Woods has been elected president of the Society of Gas Engineering of New York City.

E. A. Bechstein, manager of the Sandusky Gas & Electric Company, Sandusky, O., has been elected president of the Ohio Electric Light Association.

Daniel Talbott, formerly of North Middletown, Ky., has been appointed assistant manager of the Citizens Electric Light & Gas Company, of Indianapolis, Ind.

William J. McCorkindale, general manager of the Wilmington Gas Company, Wilmington, Del., has been elected president of the Rotary Club of that city.

Societies and Associations

The Canadian Gas Association has issued its program for its annual convention, to be held at Quebec, Aug. 16 and 17. The executive meeting will be held at 8.45 a. m. Aug. 16. The meeting will be called to order at 9.30 a. m. Mayor Laviguer of Quebec will deliver the address of welcome. In the afternoon the Quebec Railway Company will provide a special observation car, leaving the Chateau Frontenac at 2.15 p. m. for a trip around the city and suburbs. On the return the car will stop at the wharf from which the steamer will leave on a tour of Quebec Harbor, visiting en route the famous Quebec Bridge, the new Government Dry Dock and other points of interest. The morning of the seventeenth will be devoted to the reading and discussion of papers, etc., and in the afternoon, a special electric car will leave the Quebec and Montmorency Railway Station at 2.30 p. m. for St. Anne de Beaupré, on the return trip stop will be made at Montmorency Falls, when dinner will be served at the Kent House. On the eighteenth the members and guests will be free all day to inspect the appliance exhibits, and to see other places of interest. Fifty-eight reservations have been made for the boat between Toronto and Quebec. Others will get on at various points, which will bring the total number, travelling by this means to the convention city, up to 75. J. P. King, of Stratford, Ontario, will be in charge of the entertainment features on the boat. The following papers are listed for the meeting:

Gas Lighting. By J. P. Conroy, manager, General Gas Light Company, New York.

What is a Gas Meter? By J. B. McNary, manager, Canadian Meter Company, Hamilton, Ontario.

A Comparison of Modern Coal Carbonization Systems. By Vernon Baker, engineer, D. R. Russell Engineering & Development Company, St. Louis, Mo.

Is Industrial Fuel Business Worth While? By H. E. G. Watson, Consumers' Gas Company, Toronto, Ont.

The Relationship Between the Accounting and Operating Departments. By H. K. Tennent, accountant, Quebec Railway, Light, Heat and Power Co., Quebec.

Some Wrinkles on Distribution. By P. B. Lamp, Ottawa Gas Co., Ottawa, Ont.

The following manufacturers will have exhibits:

A. B. Gas Stove Company	Montreal
Beler Water Heater Company	Pittsburgh, Pa.
Canadian Meter Company	Hamilton, Ont.
Detroit Stove Works	Detroit, Mich.
General Gas Light Company	New York
International Hale Gas Mixer Company	Detroit, Mich.
Mechanics Supply Company	Quebec
Mueller Mfg. Company	Sarnia, Ont.
McClary Mfg. Company	London, Ont.
Pittsburgh Water Heater Company	Pittsburgh, Pa.
Ruud Mfg. Company	Pittsburgh & Toronto
Roberts & Mander Stove Company	Philadelphia, Pa.
Reliable Stove Company	Cleveland, Ohio
Scientific Heater Company	Cleveland, Ohio
Standard Meter Company	Toronto
Gurney-Massey Company	Montreal

The Illuminating Engineering Society will hold its annual convention in Philadelphia, Sept. 18 to 20, at the Bellevue-Stratford Hotel. In addition to the committee reports and other papers, the following papers will be presented:

Colored Glasses for Illuminating Engineering, by H. P. Gage, Corning Glass Works, Corning, N. Y. The different colors available in glass are discussed from the glass manufacturer's standpoint, and in illustration of the absorption spectra, either by spectrophotometric curves or by photographs, is given. All of the colors of the spectrum can be produced in greater or less purity, the purest colors being used in railway signal work, and tinted glasses being used for eye production. The uses of the colored glasses in illuminating engineering are mentioned, and include eye protection, signalling, decorative effects and correct color rendering.

The Effects of Brightness and Contrast of Vision, by Dr. P. G. Nutting, Eastman Kodak Company, Rochester, N. Y. The author, who is chairman of the committee on glare, has given a great deal of attention to his subject and a splendid scientific contribution may be anticipated. The ability to see clearly and comfortably is our sole means of judging the quality of lighting. Seeing ability depends upon the intensity and distribution of light flux at the retina, and these in turn upon the brightness and contrast in the field viewed, which are themselves finally determined by the illumination provided and the reflecting power of the objects viewed. Visual acuity, efficiency and comfort are analyzed, and data is given showing the dependence of each upon absolute brightness and contrast, both central and oblique and upon the rate of change of each with time.

Apparent Brightness and Its Properties, by Dr. L. T. Troland, Physical Laboratory, National Lamp Works. Owing to the increasing appreciation of the importance of brightness in illuminating engineering problems, this careful research, which, though conducted independently of Dr. Nutting's, covers some similar ground, will be of very considerable scientific and practical interest. This paper will be a discussion of the nature of luminosity as an aspect of visual sensation. It will consider the probable psychological character and physiological basis of luminosity; the various properties exhibited in common by sensations equal to luminosity but differing in color, etc.; the practical importance of these facts and of the many unsolved problems which they suggest. The work of earlier investigators will be drawn upon for data, but numerous original experiments bearing on the question of sensory brightness and especially on the principles of heterochromatic photometry will be reported.

Street Lighting, by Ward Harrison, National Lamp Works, Cleveland. The author has made a number of original suggestions in connection with street lighting and this paper will undoubtedly contribute much to the knowledge of this important art.

Gas and Electric Lighting in the Home, by C. H. French and J. C. Van Giesen, Public Service Electric Corporation of New Jersey. The authors have studied this problem from the standpoint of the commercial men of the Public Utility Company. The conclusions will be of considerable interest to commercial men as well as illuminating engineers.

Optic Projection as a Problem in Illumination, by J. A. Orange, Research Laboratory, Schenectady, N. Y. With the widely spreading application of artificial light to stereopticons, moving pictures, search-lights, etc., questions of projection are becoming of very considerable economic importance. The author has made very thorough investigations along this line and will undoubtedly contribute much new and valuable information.

Industrial Lighting by Gas, by J. D. Lee, United Gas Improvement Company, Philadelphia, Pa.

Gas Illumination of the Philadelphia Civic Exposition, by C. S. Synder and F. H. Gilpin. The Philadelphia To-day and To-morrow Exposition occupied a permanent shed covering an area of 90,000 sq. ft. This entire area was divided by screens into a large number of booth sections, the sides of which were used to display additional

exhibits. For the illumination of this area, eighty 4-lamp clusters with a total consumption of about 3000 cu. ft. of gas per hour were installed with their centers 20 ft. from the floor. A complete description of the method of installation and illumination obtained is given in detail.

EXPERIMENTS ON THE EYE WITH PENDENT REFLECTORS OF DIFFERENT DENSITIES, by Drs. C. E. Ferree and G. Rand.

This paper covers the application of the Ferree fatigue test to translucent reflectors. It continues the series of papers which these authors have contributed to the society.

STUDIES OF ECONOMICS IN OFFICE BUILDING LIGHTING, by S. G. Hibben, consulting Engineer, Pittsburgh, Pa. (formerly illuminating engineer for the Macbeth-Evans Glass Company). This paper presents data representng the practice of large office building lighting in the city of Pittsburgh.

RECENT DEVELOPMENTS IN PRISMATIC GLASSWARE, by C. W. Roosa and H. L. Jenkins, Holophane Glass Company, Inc., Newark, Ohio. This is a short resume of the more recent developments in this type of lighting appliances.

Construction Notes

BARING CROSS, ARK.—Citizens of Baring Cross, it is said, will install their own pipe system unless the Little Rock Gas & Fuel Company begins work at an early date extending gas mains to that point.

KINGSBURG, CAL.—This town is to be supplied with gas by the River Bend Gas & Water Company, which supplies Parlier.

LOS BANOS, CAL.—A $20,000 gas plant, it is said, will be built here by B. S. Pedersen and W. H. Worswick, Jr., of Los Banos, Cal.

NEWPORT BEACH, CAL.—This city has purchased the plant of the West Coast Gas Company, and has leased the distributing system, which extends also to Balboa Island.

POMONA, CAL.—Eight cities in Pomona and San Gabriel valleys will be served with natural gas within ten months, according to the plans of the Southern Counties Gas Company.

POMONA, CAL.—The local gas plant, which is to be taken over by the Southern Counties Gas Company, is to be entirely remodeled by the new owners, the old machinery being replaced by new.

SAN DIEGO, CAL.—The San Diego Consolidated Gas and Electric Company expects to build at once a new gas generator and a lamp black dryer, the combined cost of which will be $45,000. A gas purifier also will be built in the near future, which will cost several thousand dollars.

NEW BRITAIN, CONN.—The New Britain Gas Light Company has decided to stop all construction work until more labor is available. The company has found it difficult to hold men, even with high wages.

SAVANNAH, GA.—This city is planning the construction of a gas and electric-light plant. E. K. Conant is City Engineer.

ALTON, ILL.—The installing of new gas making equipment has been found necessary by the Alton Gas & Electric Company, on account of a great increase in business.

PLAINFIELD, ILL.—The Western United Gas & Electric Company are doing considerable work on their lines here. A large gang of men are laying a six-inch pipe over the DuPage River.

WATSEKA, ILL.—A gas plant is to be built and operated here by Louis Frith.

TERRE HAUTE, IND.—The Citizens Gas Company of Terre Haute has petitioned the Public Service Commission for permission to issue $186,000 in bonds, the proceeds of which will be used in making improvements to the plant.

DAVENPORT, IOWA.—Three district governor stations are being added to the equipment of the Peoples Light Company.

ESTHERVILLE, IOWA.—A gas plant is under construction here.

SPENCER, IOWA.—This city is growing impatient for the gas plant for which a franchise was granted the Gas Construction Company of Omaha last year. Notice has been served that the franchise will be forfeited unless work is begun at once.

ALEXANDRIA, LA.—Local interests are very desirous of securing gas service for the city. A committee has been appointed to take the matter in hand.

SPENCER, MASS.—The Spencer Gas Company is adding a new 100,000-ft. gas holder to its equipment. The contract is in the hands of Davis & Farnum of Waltham, Mass.

BATTLE CREEK, MICH.—The Calhoun Gas Company has purchased the Brennan Boiler Company plant at this city. It is believed that the gas company whose plant adjoins the site of this works contemplates large improvements to care for future gas production.

GREENVILLE, N. C.—Citizens recently voted in favor of a privately owned gas plant as opposed to a municipal project.

WILSON, N. C.—It is reported that rapid progress is being made on the construction of the new gas plant here. The American Gas Construction Company has the contract for this work.

BUFFALO, N. Y.—The Buffalo Gas Company has asked for permission to extend its mains to serve several large manufacturing concerns and individuals in the northern section of the city. It is proposed to construct a 12-in. main from a point near the juncture of Kail Street and Military Road, easterly in Amherst Street, to Elmwood Avenue & Amherst Street. The estimated cost of the work is about $9,000.

OWEGO, N. Y.—The Empire Gas & Electric Company has purchased the plant of the Owego Gas Light Company.

NAPOLEON, OHIO.—The Ohio Gas Light & Coke Company is making extensive improvements and additions to the plants in Napoleon and Bryan. They will total $30,000 in cost.

EL RENO, OKLA.—The first carload of pipe for the new natural gas pipe line has been received in El Reno and construction work has been started by the pipe line company. It is anticipated that natural gas will be turned on some time in December of this year.

LA GRANDE, ORE.—The Corporation Commission has granted a permit for a gas plant for La Grande. Arrangements are being made for the installation of the plant, it being proposed to use wood waste for the purpose. Piping is being installed.

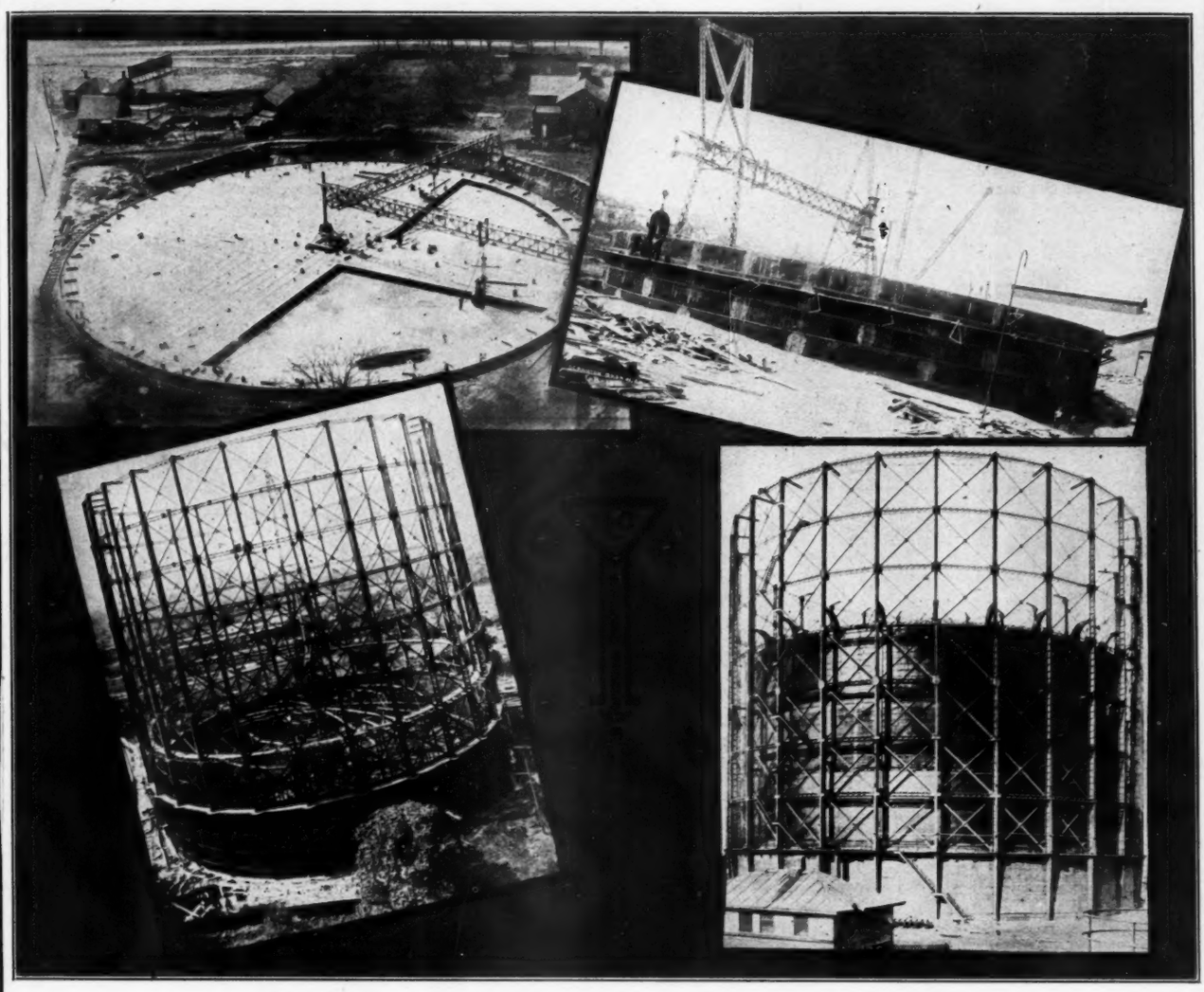
GIRARDVILLE, PA.—The gas lines in this city will be extended to Summit Hill and Lansford.

LANSFORD, PA.—The Girardville Gas Company of Girardville, whose principal office is at Philadelphia, is building a gas plant in the Panther Creek Valley to supply with gas the boroughs of Lansford, Coaldale, Summit Hill and Nesquehoning.

SHARON, PA.—Work was started last week on removing 8 miles of 8-in. cast iron pipe, running from a point in Hickory Township to the state line near Middlesex, by the United Natural Gas Company. The pipe removed will be used in the construction of a new 8-in. trunk line, and will extend from Sharon to Osgood, where it will tap the Ashtabula line. Several hundred men will be employed in the work, and when it is completed, there will be three 8-in. lines feeding Sharon. The line to be removed formed a part of the old emergency line to Youngstown. For many years it was frequently called in service to help out the consumers in that place. In constructing the new line, all joints will be welded. The new line will be of a total length of 16 miles, and will run through Clarksville.

SAN ANTONIO, TEX.—The San Antonio Gas & Electric Company has contracted for the construction of a new gas holder of large capacity.

TWO RIVERS, WIS.—W. L. Weber has applied for a gas franchise at this city.



RITER-CONLEY COMPANY

STEEL CONSTRUCTION

PITTSBURGH

HELME & McILHENNY

1339-1349 Cherry St., Philadelphia, Pa.

ESTAB. 1848 H & McI High Grade Meters

GAS METERS

HINMAN DRUM STATION METERS, FOULIS GAS GOVERNORS
PREPAYMENT METERS

REPAIRING AND CONVERTING

PROMPT SHIPMENTS - - - - - CORRESPONDENCE SOLICITED

Financial Notes.

THE WESTERN STATES GAS & ELECTRIC COMPANY has declared a quarterly dividend of one-half of 1 per cent, payable August 15, to stock of record July 31.

THE UNITED GAS IMPROVEMENT COMPANY is showing a decided growth this year, due in part to generally prosperous conditions and also to success of the new department of the company in increasing sales of gas appliances. This department was established about eight months ago, and for five months ended May 31, 1916, no less than 297,000 such gas appliances were sold and distributed among various companies in which the United Gas Improvement is interested, against 161,000 in the same five months of 1915, an increase of 49 per cent. These gas appliances are for cooking, heating and industrial purposes, the last named including small gas engines, blow pipes, bakers' ovens, hotel hot water heaters, etc.

Gross receipts of the United Gas Improvement subsidiaries outside of Philadelphia, for half year ended June 30, 1916, gained 8 per cent over corresponding six months of 1915. The gain in six months of 1915 over 1914 was only 1.4 per cent. In Philadelphia, half year gas sales were an increase of 7.55 per cent as against a decrease of 1.9 per cent in 1915. There have been no sales of securities of subsidiary companies in the first six months of 1916 to help swell the United Gas Improvement net income, the earnings being from regular channels; but net earnings are still benefiting from the 5 year contracts for oil, placed by the principal subsidiary companies in 1914 at prices much below the present market, which is aiding materially in keeping down operating and manufacturing costs.

CITIES SERVICE COMPANY for June and the six months ended June 30, broke all former records both in amount of earnings and in gains made over the corresponding periods of the preceding year. The gross earnings for June were $740,849, a gain of $446,329 over June, 1915, while for the first half of 1916, the gross earnings were $4,065,156, a gain of $1,979,497 over the first half of 1915. Earnings of the utility properties are now running at the highest rate in their history. What this means to the stockholders of the company may be better realized when it is understood that as a result of the rate at which earnings of the strictly utility properties are now running, City Service can carry out its announced dividend policy over the next five years from the income received from the utility properties alone, leaving earnings of the large oil properties entirely out of the estimates. For June, 1916, the surplus for the $18,134,619 common stock, after providing for all expenses and charges, including preferred dividends, was equivalent to 2.88 per cent on the outstanding common stock, or at the annual rate of 34.56 per cent. For the 12 months ended June 30, 1916, the dividend requirements on the $34,833,792 preferred stock were earned 3.2 times, as compared with 2.1 for the preceding 12 months. The rapid rate at which earnings of the subsidiary companies are increasing is shown by the fact that for the year ended May 31, 1916, combined gross revenues of operated properties were $26,175,121, compared with $20,104,429 for the 12 months ended May 31, 1915, a gain of $6,070,692.

With the retirement of the $7,000,000 5-year 7 per cent notes July 12, 1916, interest on this issue ceased, and from now on Cities Service Company will have no fixed charges aside from interest on its 5 per cent Convertible Debentures, the amount of which July 10 was but $139,175. The company has no floating debt except its small current accounts. The retirement of the 7 per cent notes leaves the preferred stock with a first claim except for the above noted Debenture Bonds, on all assets and earnings of the company.

THE CONSOLIDATED GAS COMPANY stock opened Monday, August 7, at 136¾, against a close of 136 on Saturday, and advanced to 138. At present it is selling at about 6 points below its high for the year, which was made in January, at the top of the industrial boom. Men who are closely in touch with the affairs of the company point out that talk of an extra or an increased dividend is not to be scoffed at. The company's earnings are good and, moreover, it is said to have completed all the extensions and improvements it has had under way for some time.

THE MONTANA POWER COMPANY reports that so far this year net earnings have been 3½ times fixed charges. Gross for three months ended June 30, $1,477,434, or increase of 51 per cent over same period of 1915. Net earnings $1,133,696, or increase of 63.5 per cent.

THE UNION NATURAL GAS CORPORATION reports total revenues amounting to $4,039,250, for the six months ended June 30. Net after expenses and taxes $2,300,752, with profit and loss surplus, June 30, of $1,625,070.

THE NORTHERN CALIFORNIA POWER COMPANY reports gross earnings of $498,677 for the six months ended June 30, as compared with $358,200 in same period of 1915. Surplus after all charges and depreciation, $50,567, as compared with $3,815 a year ago.

THE OHIO FUEL SUPPLY COMPANY announces that after October 31, it will cease distribution of natural gas for industrial consumption, and will conserve its supplies for domestic use.

THE MANKATO GAS & ELECTRIC COMPANY, a subsidiary of the Northern States Power Company, has called for redemption November 1, all its outstanding 5 per cent consolidated bonds and all its outstanding first mortage bonds, both at 105 and interest. The calling of these bonds is part of the plan for the consolidation of the funded indebtedness of the Northern States Power Company and its subsidiaries.

Current Prices of Public Utility Securities

	Bid	Asked
Adirondack Elec. P	25	27
Adirondack Elec. P. pf	77	80
*American Gas & Electric	144	148
*American Gas & Electric pf	49	51
American Light & Traction	376	380
American Light & Traction pf	109	111
American Power & Light	69	72
American Power & Light pf	84	86
American Public Utilities	42	47
American Public Utilities pf	74	77
Amer. Water W. & Elec	8¼	9¼
Amer. W. W. & E. part'g pf	18	20
Amer. W. W. & E. 1st pf	57	62
Carolina Pow. & Lt	26	30
Carolina Pow. & Lt. pf	97	100
Cities Service	300	302
Cities Service pf	85¼	86¼
Colorado Power	23	26½
Colorado Power pf	99	103
Commonwealth, Pr., Ry. & Lt	64	66
Commonwealth, Pr. Ry. & Lt. pf	84	86
Denver Gas & Electric gen. 5s	96¾	97¾
Electric Bond Deposit pf	85	87
Electric Bond & Share pf	99½	103
Empire District El. pf	88½	92½
Federal Light & Traction	10	12
Federal Light & Traction pf	45	49
Gas & Electric Securities	300	—
Gas & Electric Securities pf	96	99
Northern States Power	85	87¼
Northern States Power pf	95	97½
Pacific Gas & Electric	58	59
Pacific Gas & Electric pf	88	90
Republic Ry. & Light Co	39½	41
Republic Ry. & Light Co. pf	75	77
*Standard Gas & Electric	14½	16
*Standard Gas & Electric pf	39	41
Tennessee Ry., Light & Power	10	12
Tennessee Ry., Light & Power pf	47	51
Toledo Trac., Light & Power	46	48
Toledo Trac., Light & Power pf	82	85
United Light & Railways	49	52
United Light & Railways 1st pf	74	76

*Par value $50